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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/630,279	07/29/2003	Lloyd Mahlon Robeson	06359 USA	9701

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AIR PRODUCTS AND CHEMICALS, INC.  
PATENT DEPARTMENT  
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EXAMINER

FICK, ANTHONY D

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 10/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/630,279	<b>Applicant(s)</b> ROBESON ET AL.	
	<b>Examiner</b> Anthony Fick	<b>Art Unit</b> 1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 July 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>7/29/03</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Specification***

1. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 20 through 22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claims 20 and 21 recite the limitation "consisting essentially of the photoactive material". This limitation is unclear since the photoactive layer is required by claim 1 to include a polymer. Also "consisting essentially" is a relative term and it is unclear what the scope of the claim is.

5. Claim 22 recites the limitation "the light harvesting material" in line 1. There is insufficient antecedent basis for this limitation in the claim. It is assumed that the light harvesting material of claim 22 is separate from the photoactive layer within the device. Thus this material is a new material and has no antecedent basis in the claims.

### ***Claim Rejections - 35 USC § 102***

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6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1 through 6, 11, 12, 15 through 21, 23 and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Naito (U.S. 5,536,588).

Naito discloses an amorphous organic polymer composition for use in various applications. The polymer composition comprises dye molecules mixed in polycarbonate or polyimide to form a single-phase mixture (column 4, paragraph 1).

Regarding claim 1, Naito discloses the Tg of the mixture is at least 125 °C (column 4, paragraph 1) and is utilized within an organic solar cell element comprising an anode and cathode, a photoactive layer of the single-phase mixture between the electrodes, the photoactive material being a light harvesting organic material, a hole transporting organic material or a charge transporting material, and the layer is in electrical communication with the anode and cathode (column 7, paragraph 4). Naito further discloses the dye molecule content of the mixture is at least 20% by weight (column 6, paragraph 3).

Regarding claims 2 and 3, Naito further discloses utilizing a transparent substrate, glass, next to a transparent anode, ITO electrode (column 7, paragraph 3).

Regarding claims 4, 5 and 6, Naito discloses the polymer is amorphous and not conductive, has a glass transition above 150 and is a polycarbonate or polyimide (column 4, paragraph 1).

Regarding claim 11, Naito discloses a mixture of dye at least 50% by weight (column 6, paragraph 3).

Regarding claim 12, Naito discloses the use of a triphenylamine derivative as the hole transporting organic material (column 16, paragraph 1).

Regarding claims 15 through 19, Naito discloses several structures for the photovoltaic device including a two-layer structure or a three-layer structure with electron transporting layers, hole transporting layers and light harvesting layers (column 7, paragraph 5).

Regarding claims 20 and 21, Naito discloses percentages of dye within the mixture of 80% (column 6, paragraph 3) and this percentage is assumed to meet the requirement of consisting essentially of the photoactive material from the discussion within applicant's specification about the percentages of polymer within the layers.

Regarding claim 23, Naito discloses a method of producing the photovoltaic device by providing the electrodes and the photoactive layer as stated above.

Regarding claim 25, Naito discloses providing a transparent substrate on the side of the anode (column 7, paragraph 3).

8. Claims 1 and 23 through 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Shiratsuchi et al. (U.S. 6,084,176).

Shiratsuchi discloses a solar cell utilizing an organic hole transporting agent layer. As shown in figure 1, the solar cell comprises an anode, a cathode and a photoactive layer between the electrodes.

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Regarding claim 1, the hole-transporting layer is prepared by mixing the organic hole transporting material with a polymer binder of polycarbonate or polyarylate (column 29, paragraph 4). As these are the polymers utilized in the present invention, the glass transition temperature is inherently greater than 125 and the polymer and organic material are in a single phase. The percentage of polymer is disclosed as less than 50 %, thus the photoactive material is greater than 50 % by weight (column 29, paragraph 4).

Regarding claim 23, a method of manufacturing the solar cell is also disclosed by providing the electrodes and the photoactive layer.

Regarding claim 24, Shiratsuchi discloses manufacturing the photoactive layer by spin coating (column 29, paragraph 4).

Regarding claim 25, figure 1 also shows a transparent substrate on the side of the anode.

### ***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naito as applied to claims 1 through 6, 11, 12, 15 through 21, 23 and 25 above.

The disclosure of Naito is as stated above for claims 1 through 6, 11, 12, 15 through 21, 23 and 25.

The difference between Naito and claims 13 and 14 is the requirement of specific organic electron transporting materials and light harvesting materials.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to select the electron transporting materials and light harvesting materials as in the claims for the device of Naito because the materials are well known within the art to be used within organic solar cell devices. Thus one of ordinary skill in the art would select one of the materials within the claims as they are functional equivalents to the materials used by Naito.

11. Claims 7 through 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naito as applied to claims 1 through 6, 11, 12, 15 through 21, 23 and 25 above, and further in view of Burgoyne, Jr. (U.S. 6,060,170).

The disclosure of Naito is as stated above for claims 1 through 6, 11, 12, 15 through 21, 23 and 25.

The difference between Naito and the claims is the requirement of a specific polymer.

Burgoyne, Jr. teaches the use of the polymers within the claims to create thermoset polymers with high glass transition temperatures (abstract and column 15).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the polymers of Burgoyne, Jr. within the device of Naito because the polymers have a high glass transition temperature and can be used to protect semiconductor devices (column 43, paragraph 2). Because Naito and Burgoyne, Jr. are both concerned with polymers with high glass transition temperatures,

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one would have a reasonable expectation of success from the combination. Thus the combination meets the claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Fick whose telephone number is (571) 272-6393. The examiner can normally be reached on Monday thru Friday 7 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Anthony Fick *ADF*  
AU 1753  
September 29, 2006

  
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